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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/082,264	05/20/1998	JIASHU CHEN	CHEN-1-(5442	2496

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EXAMINER

GRIER, LAURA A

ART UNIT PAPER NUMBER

2644

DATE MAILED: 01/15/2004

23

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/082,264

Applicant(s)

CHEN, JIASHU

Examiner

Laura A Grier

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21, 23, 25 and 27-77 is/are pending in the application.
- 4a) Of the above claim(s) 27-77 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8 is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-21, 23, and 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The allowability of claim 15 and 17 has been withdrawn in respect the Office Action below.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9 (dependent claims 10-14), 15, 21, 23, and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding independent claims 9, 15, 21, 23, and 25, respectively, recites, “plurality of positions including multiple reflections, multiple sources without reflections, and multiple sources with multiple reflections”. It is unclear to the examiner whether or not the “multiple reflections” are inclusive in the “multiple sources with reflections”. In other words, it is unclear whether or not the sound signal composed of the plurality of sound source positions is composed of three components based upon reflections or composed of two components based upon reflections. Thus the claim language makes the claimed invention indefinite.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claims 1-7, 16-19** are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al.

Regarding **claim 1**, Chen et al. discloses methods and apparatus for producing directional sound. Chen et al.'s disclosure comprises means of determining a characteristic function, wherein the characteristic constitutes a head-related impulse response and are determined based upon a plurality of positions in a space (col. 3, lines 58-62), means of applying the characteristic function as a filter, and means of converting the filtered signal to a sound wave thus providing/producing the sound wave to a listener (figure 5b, col. 6, lines 45-67 - col. 7, lines 1-5 and col. 8, lines 1-25), and as well, Chen disclose the use of a discrete number samples to be used and eigenvalues (col. 4, lines 8-57, and col. 5, lines 49-53).

Regarding **claim 2**, Chen et al. (herein, Chen) discloses everything claimed as applied above (see claim 1). Chen et al.'s disclosure further support for the characteristic function comprising data information related to the environment in which the sound is perceived (col. 3, lines 63-64).

Regarding **claims 3-7**, Chen discloses everything claimed as applied above (see claim 1). Chen et al.'s disclosure further inherently provides support of a spatial feature extraction and regularization model; spatial component and temporal component (summed matrix of a

Art Unit: 2644

predetermined number of eigen vectors ranging from 3 to 16); and wherein the components are determined by a Karhunen-Loeve Expansion (col.4, lines 24-67 - col. 5, lines 1-53).

Regarding **claim 16**, Chen et al. discloses methods and apparatus for producing directional sound. Chen et al.'s disclosure comprises an environment input for receiving information of regarding the listening of the listener; means constituting a calculator with a computer program (col. 5, lines 58-65 and col. 7, lines 6-50); input for receiving a signal representing a sound which based upon a plurality of positions in a space (col. 3, lines 58-62); and left and right channel with a filter array for applying a filter to the signal, in which the function of the filter comprises a head-related impulse response; and an output for converting the filtered signals to the binaural sound and producing a sound to the listener (figure 5a and col. 6, lines 20-44 and col. 13, lines 2459) . Further Chen's disclosure comprises eigen filters and placement arrays (col. 4e, lines 8-21, col. 6, lines 20-44, and col. 7, lines 6-21 and figure 5a).

Regarding **claim 18**, Chen's disclosure comprises eigen filters (col. 4e, lines 8-21, col. 6, lines 20-44, and col. 7, lines 6-21 and figure 5a).

Regarding **claim 19**, Chen discloses everything claimed as applied above (see claim 16). Chen further discloses interaural time processing (col. 7, lines 6-21).

Regarding **claim 17**, Chen et al. discloses methods and apparatus for producing directional sound. Chen et al.'s disclosure comprises an environment input for receiving information of regarding the listening of the listener; means constituting a calculator with a computer program (col. 5, lines 58-65 and col. 7, lines 6-50); input for receiving a signal representing a sound which based upon a plurality of positions in a space (col. 3, lines 58-62); and left and right channel with a filter array for applying a filter to the signal, in which the

function of the filter comprises a head-related impulse response; and an output for converting the filtered signals to the binaural sound and producing a sound to the listener (figure 5a and col. 6, lines 20-44 and col. 13, lines 2459). Further Chen's disclosure comprises eigen filters and placement arrays (col. 4e, lines 8-21, col. 6, lines 20-44, and col. 7, lines 6-21 and figure 5a), wherein the signal is filtered, and summed/added and output to the eigen filters for adequate temporal filtering (figure 5b and col. 6, lines 45-67 and col. 7, lines 1-21).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. **Claims 21, 23, and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Begault.

Regarding **claims 21, 23, and 25**, Begault discloses a multichannel spatialization system for audio signals (figure 1). Begault's disclosure comprises delaying a sound source signal in a digital filter (16₁-16₄), col. 4, lines 61-68 and col. 5, lines 1-26; attenuation and filter of an input signal takes place in a low pass filter (12₁-12₄), col. 4, lines 7-10; further the digital filter provides more filtering and weighting of the filter sound signals (col. 6, lines 51-68, col. 7, lines 1-13, 42-53 and figure 2); and a summing network for summing the filtered sounds, wherein the filtered attenuated sound signal remains constant with a delayed signal, wherein the signals are

Art Unit: 2644

adaptable to change position perspective in respect to the listener (col. 10, lines 48-68 and col. 11, lines 01-12). Eventhough, Begault fails to specifically disclose the sound reflections as claimed, he does disclose the input audio signals are discrete from each other. Sound sources with reflections well known and as well sounds without reflections well known in the art. Thus, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Begault by implementing the individual audio signal inputs as having a signal comprising reflections and some having without having reflections for the purpose of enhancing the spatial effect of the input signal prior to processing for generating virtual sound to the listener.

13. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Sekine et al.

Regarding **claim 20**, Chen discloses everything claimed as applied above (see claim 16). However, Chen fails to specifically disclose a cross-talk canceller. The examiner maintains that a cross-talk canceller was well known in the art.

Regarding a cross-talk canceller, in a similar field of endeavor, Sekine et al. discloses a sound-image position control apparatus. Sekine et al.'s apparatus comprises a cross talk canceller. (Col. 5, 2nd paragraph).

It would have been obvious to one of the ordinary skill in the art at the time the invention was made to modify the invention of Chen by implementing a cross talk canceller prior to reproduction to speakers for the purpose of canceling/eliminating the cross-talk sounds which emerge when a person hears with both ears as taught by Sekine et al.

Allowable Subject Matter

14. Claim 8 is allowed.

15. Claims 10-14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

16. Claims 9, 15 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

17. Applicant's arguments with respect to claims 1-7, 9-21, 23, and 25 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed 10/23/03 have been fully considered but they are not persuasive.

The applicant argues that the prior art of reference, Chen fails to teach head-related impulse response and eigenvalues. The examiner still maintains that Chen does disclose the use of head related impulse response and eigenvalues, see col. 6, lines 56-67 and col. 7, lines 1-5 (impulse response), and col. 4, lines 8-67 and col. 5, lines 1-53). However, the 103 rejection of claims 1-7, 16, 18-19 using Chen has been replaced with a 102 rejection using Chen. The applicant repeatedly argues that a head-related transfer function is not a head-related impulse response. However, the applicant has not provide a statement indicating the difference between a head related impulse response and a head related transfer function. And, in the applicant's drawings and in the specification, head related transfer function is used along with a head related impulse response. It is understood that a head related impulse response is a head related transfer function. In respect to the applicant arguments of the multiple reflections, multiple sources with

Art Unit: 2644

reflections and multiple sources without reflection, the Begault reference of prior has been used in a 102 rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura A Grier whose telephone number is (703) 306-4819. The examiner can normally be reached on Monday - Friday, 7:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks


Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

LAG 
January 12, 2004


XU MEI
PRIMARY EXAMINER